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10/590,158	08/21/2006	Tomohiro Oshiyama	06571/HG	4142

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EXAMINER	
WILSON, MICHAEL H	

ART UNIT	PAPER NUMBER
1786	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/590,158	OSHIYAMA ET AL.	
	Examiner	Art Unit	
	MICHAEL H. WILSON	1786	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 August 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1,12-24 and 28-30* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1,12-24 and 28* is/are rejected.

8)☒ Claim(s) *29 and 30* is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office action is in response to Applicant's amendment filed 08 August 2011, which amends claims 1 and 15 and cancels claims 25 and 26.

Claims 1, 12-24, and 28-30 are pending.

2. Applicants overcame the rejection of claims 1, 12-14, 15, 17, and 23-26 under 35 U.S.C. 103(a) as being unpatentable over Brown et al. (US 2004/0086743 A1) by amending the claims in the reply filed 08 August 2011.

3. The Examiner withdraws the provisional rejection of claims 1, 15, 18, and 23-30 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 9, 13, 18-43, 45, and 46 of copending Application No. 11/632389 because copending Application No. 11/632389 is now abandoned.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1, 12-16, 23, 24, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kita et al. (JP 2003/109758 A), machine translation relied upon in view of Brown et al. (US 2004/0086743 A1).

Regarding claims 1, 12, 14, 15, and 28, Kita et al. disclose an organic electroluminescent element [0017] comprising an ortho-metallated platinum complex comprising an aryl group where free rotation is blocked (complex 111 [0082] page 23). Free rotation of the aryl group is blocked by phenyl groups being present on the R_1, R_3 and R_4 positions and discloses wherein the phenyl may be further substituted ([0034], compounds 41-44 [0077] page 18, and compound 114 [0082] page 23). The reference also discloses a light-emitting layer which comprises the platinum complex [0032] and a device comprising the light-emitting layer [0180].

The reference discloses an “n” of 3 with an “m” of 1 instead of an “n” of 1 or 2 as presently claimed. However n + m = 4 is clearly an error in the reference. A stable octadentate platinum complex is not possible. The coordination sphere of platinum is full where there are only six ligands. Platinum(II) is a common platinum cation used to form luminescent complexes. This metal ion is well known to form square planar complexes (m=1 and n=1) due to its electron configuration (d^8). Therefore one of ordinary skill in the art at the time of the invention would readily recognize m=3 with n=1 to be an error in the reference and would readily expect platinum complexes of m =1

and n =1 to suitable complexes for layer and device of Kita et al. and within the teachings of Kita et al. However the reference does not explicitly disclose wherein the phenyl substituent (where free rotation is blocked) is substituted by an electron donating group.

Brown et al. teach a similar organic electroluminescent device ([001] and [0035]). The reference teaches the light-emitting layer comprising a host material and a phosphorescent complex [0011]. The phosphorescent complex is taught to preferably be an iridium or platinum complex [0069] with a phenylpyridine ligand ([0072]-[0075]) which can have substituted aryl substituents ([0013]-[0016]). The reference teaches the specific substituted aryl groups including 2,6-dimethylphenyl and 2,4,6-trimethylphenyl groups (3rd and 4th ligands in Figure 6). Methyl groups are electron donating groups.

Given the teachings of Brown et al. that methyl groups are suitable substituents for a substituent phenyl group of phenylpyridine ligands it would be obvious to one of ordinary skill in the art at the time of the invention to use methyl as a substituent on phenyl in the complex of Kita et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that Kita et al. teach substituents to be suitable and Brown et al. teach methyl to be suitable for substituted aryl substituents. One of ordinary skill in the art would be motivated by a desire to form new complexes within the teaching of the prior art and within the guidelines of the prior art for the purposes of the prior art.

Regarding claim 13, modified Kita et al. disclose all the claim limitations as set forth above. Additionally while the reference does not disclose a heteroaromatic group

where free rotation is blocked, the claim does not require the presence of the heteroaromatic group but merely requires such a group to have an electron donating substituent when present. Therefore the claim limitations are met as set forth above.

Regarding claim 16, modified Kita et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein the light-emitting layer comprises a host material [0107] of instant formula (10) (compound 1-60 [0123] page 47; compound 1-65 [0125] page 49).

Regarding claims 23 and 24, modified Kita et al. disclose all the claim limitations as set forth above. Additionally the reference discloses a display device and an illumination device comprising an organic electroluminescent element as described above [0002].

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (US 2003/0218418 A9) in view of Kita et al. (JP 2003/109758 A), machine translation relied upon, and Brown et al. (US 2004/0086743 A1) as applied to claim 15 above.

Regarding claim 17, Sato et al. disclose an organic electroluminescent device comprising a light emitting layer with a phosphorescent ortho-metallated complex ([0031]-[0034]). The reference teaches the light-emitting layer comprises a host material of instant formulae (10) [0052]. The reference also teaches that the divalent linking groups (instant L_{01}) may also be a single bond [0062] and teaches that any position of the phenyl rings is suitable for substitution [0056]. While Sato et al. does not exemplify a substituent in the instant R_{13}-R_{16} positions, this does not negate a finding of

obviousness under 35 USC 103 since a preferred embodiment such as an example is not controlling. Rather, all disclosures "including unpreferred embodiments" must be considered. *In re Lamberti* 192 USPQ 278, 280 (CCPA 1976) citing *In re Mills* 176 USPQ 196 (CCPA 1972). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a substituent in one of more of the instant R_{13}-R_{16} positions given that Sato et al. teaches each one. However the reference does not explicitly disclose a phosphorescent complex with an aryl group where free rotation is blocked.

Modified Kita et al. disclose an ortho-metallated platinum complex wherein free rotation of an aryl group is blocked, as described above. Additionally the reference teaches the complexes of modified Kita et al. to have excellent luminescence with blue color [0032].

It would be obvious to one of ordinary skill in the art at the time of the invention to use the complex of modified Kita et al. in the device of Sato et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that both references teach light-emitting layers with carbazole host materials and modified Kita et al. teach complexes suitable for use in the light-emitting layer of an electroluminescent device. One of ordinary skill in the art would be motivated by a desire to have excellent luminescent of blue.

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kita et al. (JP 2003/109758 A), machine translation relied upon, and Brown et al. (US

2004/0086743 A1) as applied to claim 15 above, and further in view of Iwakuma et al. (US 2004/0086745 A1).

Regarding claim 18, modified Kita et al. disclose all the claim limitations as set forth above. However the reference does not explicitly disclose a carboline compound as a host material.

Iwakuma et al. teach carboline compounds (compound A58-A67, pages 16-18) as host materials for the light-emitting layer [0008] of an electroluminescent device ([0012] and [0058]). The reference teaches that using a carboline compound of Iwakuma et al. improves the color purity of the device [0007].

It would be obvious to one of ordinary skill in the art at the time of the invention to use a carboline compound as the host material of the light-emitting layer as taught by Iwakuma et al. in the device of modified Kita et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that Iwakuma et al. the carboline compounds as suitable host material for phosphorescent light-emitting layers. One of ordinary skill in the art would be motivated by a desire to improve the color purity of the device.

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kita et al. (JP 2003/109758 A), machine translation relied upon, and Brown et al. (US 2004/0086743 A1) as applied to claim 15 above, and further in view of Okada et al. (US 2003/0019861 A1).

Regarding claim 19, modified Kita et al. disclose all the claim limitations as set forth above. However the reference does not explicitly disclose a hole blocking layer.

Okada et al. teach a light-emitting device [0007]. The reference teaches teach various condensed heterocyclic compounds, formulas (I) and (II), are useful in electroluminescent devices ([0009]-[0012]) and teaches specific examples of heterocyclic groups suitable as A of formula (I) and B of formula (II) ([0041] and [0051]); the groups includes carboline. The reference teaches that materials of the electron transport and electron injection layers should possess electron transporting properties and hole blocking properties [0157]. Preferred materials include compounds of formula (I).

It would have been obvious to one of ordinary skill in the art at the time of invention to use the carbolines of Okada as an electron transporting and hole blocking layer in the device of modified Kita et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that Okada et al. teach the compounds to be electron transporting and hole blocking and suitable for use in electroluminescent devices. One of ordinary skill in the art would be motivated by a desire to block holes from reaching the cathode, thus improving performance.

10. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kita et al. (JP 2003/109758 A), machine translation relied upon, and Brown et al. (US 2004/0086743 A1) as applied to claim 15 above, and further in view of Stossel et al. (US 2004/0058194 A1).

Regarding claim 20, modified Kita et al. disclose all the claim limitations as set forth above. Additionally the reference discloses boron compounds as electron transporting material for the electron transport layer [0199]. However the reference does not explicitly disclose a hole blocking layer.

Stossel et al. teach another phosphorescent organic light-emitting device [0001]. The reference teaches that boron compounds have excellent properties for electron transport and hole blocking layer [0032] and lead to high efficiencies and an increase in operating life ([0035]-[0036]).

It would be obvious to one of ordinary skill in the art at the time of the invention to use boron compounds in an electron transporting and hole blocking layer as taught by Stossel et al. in the device of modified Kita et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that modified Kita et al. teach boron compounds to be suitable for the electron transporting layer, and Stossel et al. teach boron compounds to be excellent hole blocking materials. One of ordinary skill in the art would be motivated by a desire to improve efficiency and an increase in operating life.

11. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seo et al. (US 2000/0086180 A1) in view of Kita et al. (JP 2003/109758 A), machine translation relied upon, and Brown et al. (US 2004/0086743 A1) as applied to claim 1 above, and Iwakuma et al. (US 2004/0086745 A1).

Regarding claim 21, Seo et al. disclose an organic electroluminescent element [0002]. The reference discloses the device comprises a light-emitting layer with an ortho-metallated phosphorescent compound and a host material ([0187] and [0251]-[0252]), and a hole blocking layer ([0041] and [0251]-[0252]). The blocking and light-emitting layers are mixed, therefore the hole blocking, light-emitting, and light-emitting host materials are in both hole blocking and light-emitting layers ([0044] and [0251]-[0252]). However the reference does not explicitly disclose a phosphorescent complex with an aryl group where free rotation is blocked or a carboline as the light-emitting host material.

Modified Kita et al. disclose an ortho-metallated platinum complex wherein free rotation of an aryl group is blocked, as described above. Additionally the reference teaches the complexes of modified Kita et al. to have excellent luminescence with blue color [0032].

It would be obvious to one of ordinary skill in the art at the time of the invention to use the complex of modified Kita et al. in the device of Seo et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that both references teach light-emitting layers with carbazole host materials and modified Kita et al. teach complexes suitable for use in the light-emitting layer of an electroluminescent device. One of ordinary skill in the art would be motivated by a desire to have excellent luminescent of blue.

Iwakuma et al. teach carboline compounds (compound A58-A67, pages 16-18) as host materials for the light-emitting layer [0008] of an electroluminescent device

([0012] and [0058]). The reference teaches that using a carboline compound of Iwakuma et al. improves the color purity of the device [0007].

It would be obvious to one of ordinary skill in the art at the time of the invention to use a carboline compound as the host material of the light-emitting layer as taught by Iwakuma et al. in the device of Seo et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that Iwakuma et al. the carboline compounds as suitable host material for phosphorescent light-emitting layers. One of ordinary skill in the art would be motivated by a desire to improve the color purity of the device.

12. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seo et al. (US 2000/0086180 A1) in view of Kita et al. (JP 2003/109758 A), machine translation relied upon, and Brown et al. (US 2004/0086743 A1) as applied to claim 1 above, and Stossel et al. (US 2004/0058194 A1).

Regarding claim 22, Seo et al. disclose an organic electroluminescent element [0002]. The reference discloses the device comprises a light-emitting layer with an ortho-metallated phosphorescent compound and a host material ([0187] and [0251]-[0252]), and a hole blocking layer ([0041] and [0251]-[0252]). The blocking and light-emitting layers are mixed, therefore the hole blocking, light-emitting, and light-emitting host materials are in both hole blocking and light-emitting layers ([0044] and [0251]-[0252]). However the reference does not explicitly disclose a phosphorescent complex

with an aryl group where free rotation is blocked or a boron compound as the hole blocking material.

Modified Kita et al. disclose an ortho-metallated platinum complex wherein free rotation of an aryl group is blocked, as described above. Additionally the reference teaches the complexes of modified Kita et al. to have excellent luminescence with blue color [0032].

It would be obvious to one of ordinary skill in the art at the time of the invention to use the complex of modified Kita et al. in the device of Seo et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that both references teach light-emitting layers with carbazole host materials and modified Kita et al. teach complexes suitable for use in the light-emitting layer of an electroluminescent device. One of ordinary skill in the art would be motivated by a desire to have excellent luminescent of blue.

Stossel et al. teach another phosphorescent organic light-emitting device [0001]. The reference teaches that boron compounds have excellent properties for electron transport and hole blocking layer [0032] and lead to high efficiencies and an increase in operating life ([0035]-[0036]).

It would be obvious to one of ordinary skill in the art at the time of the invention to use boron compounds in the hole blocking layer of Seo et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that Stossel et al. teach boron compounds to be excellent hole blocking materials. One of ordinary skill in

the art would be motivated by a desire to improve efficiency and an increase in operating life.

Allowable Subject Matter

13. Claims 29 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter:

While the closest prior art, Brown et al. (US 2004/0086743 A1), Kita et al. (JP 2003/109758 A), and Kobayashi et al. (WO 03/084973 A1), teach a variety of platinum phenylpyridine complexes the reference do not teach or suggest the complexes of instant formulae (7) or (8) as presently claimed.

Response to Arguments

15. Applicant's arguments filed 8 August 2011 have been fully considered but they are not persuasive.

Applicants argue that none of the cited references, including Brown et al., teach or suggest the platinum complex represented by any one of Formulas (6), (7) and (8) nor is there an expectation that their use would result in or enable an electroluminescence device meeting the object of the present invention. A person of ordinary skill in the art, Applicants assert, will not conceive the structure of Formulas (6),

(7) and (8) by looking at Brown, Kita or any combination with the other cited references by the Examiner.

However Kita et al. teach platinum complexes useful as light-emitting material in organic electroluminescent devices and teaches the complexes having phenyl groups which may be further substituted ([0034], compounds 41-44 [0077] page 18, and compound 114 [0082] page 23) in the R_1 position. Brown et al. teaches similar platinum complexes with a phenylpyridine ligands ([0072]-[0075]) which may also have substituted aryl substituents ([0013]-[0016]). Brown et al. specifically teaches 2,6-dimethylphenyl and 2,4,6-trimethylphenyl groups to be suitable substituted phenyl substituents for phenylpyridine ligands in light-emitting platinum complexes. Given this teaching, absent evidence of unexpected results commensurate with the scope of the claims, it would be obvious to one of ordinary skill in the art that 2,6-dimethylphenyl and 2,4,6-trimethylphenyl groups are suitable substituted phenyl groups which may be used in the light-emitting complexes of Kita et al. and would result in similar light-emitting complexes.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL H. WILSON whose telephone number is (571)270-3882. The examiner can normally be reached on Monday - Thursday 7:30-5:00 (EST), Friday 7:30-4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer Chriss can be reached on (571) 272-7783. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer A Chriss/
Supervisory Patent Examiner, Art Unit 1786

MHW